

REMARKS

The Official Action mailed September 7, 2010, has been received and its contents carefully noted. Filed concurrently herewith is a *Request for One Month Extension of Time*, which extends the shortened statutory period for response to January 7, 2011. Also, filed concurrently herewith is a *Request for Continued Examination*. Accordingly, the Applicant respectfully submits that this response is being timely filed.

The Applicant notes with appreciation the consideration of the Information Disclosure Statements filed on June 12, 2006; September 18, 2006; February 20, 2008; and June 24, 2008.

Claims 13-24 were pending in the present application prior to the above amendment. Claims 14 and 18 have been canceled without prejudice or disclaimer and claims 13, 16, 17, 19 and 21-24 have been amended to better clarify the features of the present invention. Accordingly, claims 13, 15-17 and 19-24 are now pending in the present application, of which claims 13, 19 and 21-24 are independent. For the reasons set forth in detail below, all claims are believed to be in condition for allowance. Favorable reconsideration is requested.

Paragraph 4 of the Official Action rejects claims 13-18, 21 and 23 as obvious based on the combination of U.S. Publication No. 2003/0167425 to Bader, U.S. Patent No. 5,835,508 to Kushita and U.S. Publication No. 2002/0040460 to Choi. Paragraph 13 of the Official Action rejects claims 19, 22 and 24 as obvious based on the combination of Bader and Kushita. The Applicant respectfully traverses the rejections because a *prima facie* case of obviousness cannot be maintained against the independent claims of the present application, as amended.

As stated in MPEP §§ 2142-2144.04, to establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some reason, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second,

there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. Obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some reason to do so found either explicitly or implicitly in the references themselves or in the knowledge generally available to one of ordinary skill in the art. "The test for an implicit showing is what the combined teachings, knowledge of one of ordinary skill in the art, and the nature of the problem to be solved as a whole would have suggested to those of ordinary skill in the art." In re Kotzab, 217 F.3d 1365, 1370, 55 USPQ2d 1313, 1317 (Fed. Cir. 2000). See also In re Fine, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988); In re Jones, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992).

With respect to independent claims 13, 19 and 21-24, the prior art, either alone or in combination, does not teach or suggest all the features of the independent claims, as amended.

The Applicant has amended the independent claims for further clarity so as to more clearly define the technical features of the present invention. Each claim can provide the five following technical features/advantages.

- (a) The present invention is directed to a transmitter for 4-value FSK modulation, which transmits data using four symbol values (e.g., -3, -1, +1, +3) and a receiver which receives a 4-value FSK modulated signal transmitted from the transmitter.
- (b) Original data supplied to the present invention's transmitter is arranged in order from one with highest importance, and this original data comprises first data being protected and second data not being protected.
- (c) The first data is divided into first bit data in a unit of one bit and the second data is divided into second bit data in a unit of two bits. A redundant bit or an additional bit is added to each of the first bit data to create encoded data. The divided two bits of the second bit data are encoded as they are.

- (d) Depending on the quality of environment in a communication path, the redundant bit or the additional bit is used as a bit to be added to first bit data. That is, if the quality is bad, the redundant bit can be used, and if the quality is good, the additional bit can be used.
- (e) In the present invention, the redundant bit to be added to the first bit data is predetermined so that the first bit data added with the redundant bit corresponds to any one of specific two symbol values, such that an interval between the specific two symbol values is largest of the four symbol values.

For example, with the 4-value FSK modulation scheme, there can be signal points with large frequency deviation (symbol values: -3 and +3) and signal points with small frequency deviation (symbol values: -1 and +1). Additionally, if an environment in a communication path is degraded, a redundant bit is added to each of the data bits (of important data to be protected) obtained by dividing the important data in a unit of one bit. Additionally, the redundant bit is predetermined so that the data bit added with the redundant bit corresponds to either one of two symbol values of +3 and -3 such that an interval between the two is largest of the 4-value symbols (-3, -1, +1, +3). Thus, the use of two symbol values of -3 and +3 in transmitting the important data can improve BER by about 4.5 dB on the reception side, as compared to the use of the two symbol values of -1 and +1.

In summary, if a reception environment in a communication path is degraded, important data is arranged at a position of any one of two symbols an interval between which is largest to discriminatively receive data. On the other hand, if the reception environment is good, additional data is substituted for the redundant bit, thereby allowing more information to be transmitted. The above uniqueness and five technical features/advantages are neither taught nor suggested by Bader, Kushita and Choi.

Because Bader, Kushita and Choi do not teach or suggest all the claim limitations, a *prima facie* case of obviousness cannot be maintained with respect to


independent claims 13, 19 and 21-24. Therefore, Applicant believes the rejections of claim 13, 19 and 21-24 and claims dependent therefrom are not proper.

Accordingly, reconsideration and withdrawal of the rejections under 35 U.S.C. § 103(a) are in order and respectfully requested.

Should the Examiner believe that anything further would be desirable to place this application in better condition for allowance, the Examiner is invited to contact the undersigned at the telephone number listed below.

The Commissioner is hereby authorized to charge fees under 37 C.F.R. §§ 1.16, 1.17, 1.20(a), 1.20(b), 1.20(c), and 1.20(d) (except the Issue Fee) which may be required now or hereafter, or credit any overpayment to Deposit Account No. 50-2280.

Respectfully submitted,



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